

Case Study 2: Retention Basin Pumpdown

Conduct of Operations Course

CASE STUDY 2:

Retention Basin Pumpdown

Time Required: 90 minutes

Reference:

- (a) DOE 5480.19, Conduct of Operations Requirements for DOE Facilities
- (b) DOE-EM-STD-5505-96, Operations Assessments

Activities: Using the case study materials, the student will:

- 1. Determine how to assess DOE 5480.19, Chapters 16, Operations Procedures, 17, Operator Aids, and other pertinent chapters.
- 2. Practice collecting information needed to support a deficiency.
- 3. Formulate and write down deficiencies and support them with well researched facts.

Objectives: The above activities support student performance of the following:

- 1. Refer to a copy of DOE 5480.19 and locate applicable guidelines and requirements for specific activities. (1.a)
- 2. For each of the eighteen chapters of Attachment I to the Order, explain how each chapter contributes to an effective and safe operational environment. (1.b)
- 3. Identify the key elements of assessments, surveillance, and audits, and their application (1.c)

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Instructional Aids/Materials:

1. Instructor Guide and Student Workbook
2. Methods available for students to display results (e.g., overhead projector, projector screen, blank viewgraphs, marking pens)
3. DOE-EM-STD-5505-96, Operations Assessments

Instructor Notes:

1. Divide the class into three groups and instruct them to pick group leaders.
2. Have the facilitators provide the groups with the information enclosed in the following pages as requested by the students.
3. Keep the group focused on assessing procedures.
4. After they have completed their assessment of the WTF, have the group leaders debrief the WTF manager on their concerns.

Facilitator Notes:

1. Your group must list the *specific* documents that they desire to review and what information they will look for.
2. Your group must ask *specific* questions to *specific* individuals in order to receive the information on the attached sheets.
3. You are tasked to role-play each of the individuals interviewed. Do not let the group flip back and forth between interviews unless they have stated that they are interviewing both individuals simultaneously. In such cases, try to be hesitant in answering questions in front of your supervisor.
4. The group must ask for *specific* scenarios to observe and specify what they will look for.
5. Have your group write down their concerns and prepare to defend them.

WASTE TREATMENT FACILITY RETENTION BASIN PUMPDOWN CASE STUDY

You are assessing a waste treatment facility (WTF) that processes contaminated waste and discharges the effluent into the environment. This facility is also responsible for the retention basins that collect potentially contaminated rainwater runoff. During the assessment, you are following an operator performing his rounds. The Shift Supervisor says to the operator, "Go out to retention Basin A, and pump it down." The operator goes to the remotely located Basin A and enters the pump house. Inside the pumphouse you see the operator pull down a laminated copy of the procedure from the wall and pick up a grease pencil to check off each step when completed. The site procedure guidelines require the operator to follow the procedure verbatim and refer to it while conducting his rounds.

The operator's first step is to sample the retention basin water (it was also sampled one hour earlier). He refers to the procedure and checks the pump-suction valve and the pump-recirculation valve open. Then he starts the pump. These steps follow the copy of the procedure that you pulled from the filing cabinets in the control room. The operator fills, caps, and labels a sample bottle to be delivered to the chemistry lab for sampling. However, the procedure states that a sample must be analyzed prior to initiation of basin pumpdown.

The next series of steps requires the operator to pump down the basin. He sets the procedure aside, checks the suction valve open, the recirculation valve open, and the pump running, as required by the procedure. You notice that the next step is to shut fully the recirculation valve and then to open fully the discharge valve in that order. The operator throttles each valve in a series of steps until the recirculation valve is fully shut and the discharge valve is fully open.

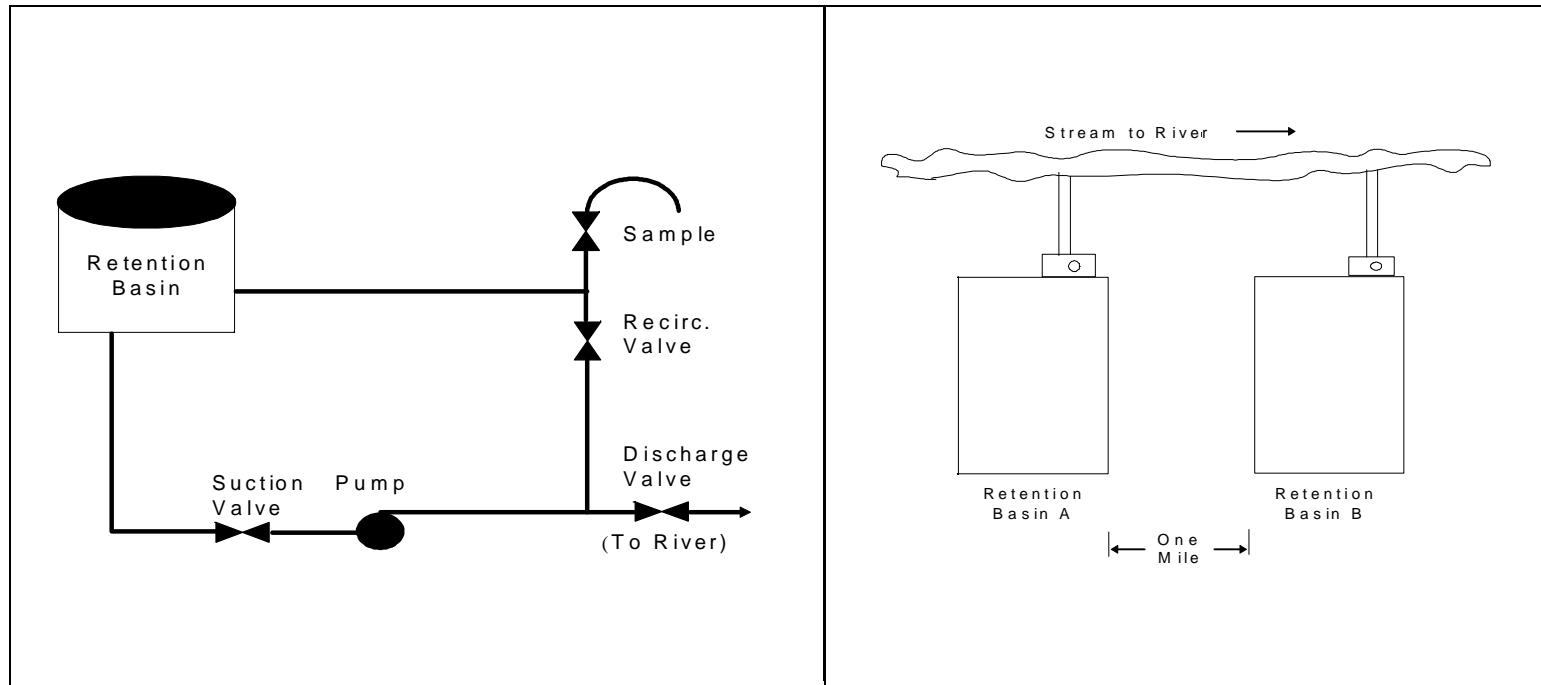
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After the basin is pumped down and the operator has completed the procedure, you ask the operator why he throttled the valves instead of shutting fully and opening fully as required by the procedure. The operator states, "I don't know but it's always been done that way and that's how we do it at retention Basin B." He then picks up the phone and asks for the shift supervisor. The shift supervisor comes out to the pump station and looks at the operator's copy of the procedure. After some discussion with the operator, he looks at you and states, "the valves are throttled to avoid deadheading the pump." You decide to take a second look around the pumphouse. During this observation, you identify that the procedure used does not have a formal approval signature from the supervisor. You turn to the operator who is with you in the pumphouse and ask why the operator aid has not been approved. The operator states that "we do not have operator aids in this facility."

Instructions:

1. Determine the initial deviations from expectations.
2. Validate your leads to determine whether what you have just observed is an isolated incident or a programmatic problem.
 - Be specific in wording what questions you will ask, what you will be looking for in a document and what you want to observe.
 - The facilitator assigned to your group will only give you the information you specifically ask for.
3. Formulate any deficiencies you have and be prepared to back them up with well researched facts.

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INFORMATION TO BE EARNED

Second Observation at Basin A

A different operator was observed and informally interviewed while performing the same pumpdown procedure observed yesterday at retention Basin A.

- The operator altered the procedure slightly, as did the operator on the previous night. Rather than opening a valve fully and then shutting another valve fully, the operator throttled one and then the other in a series of steps until they were fully open or shut. When questioned, the operator said that that was the way they did it for B Basin And that it needed to be done to avoid deadheading the pump. (The same reason given by the supervisor the previous night). When asked why they didn't have the procedure changed, the operator said that it was too much trouble and took too long.

Basin B Observation

A different operator was observed pumping down Basin B. The operator followed the Basin B procedure correctly. This included throttling the valves. When questioned the operator gave the following information:

- The reason the valves are throttled is to avoid deadheading the pump, which could damage the pump.
- Everyone knows that the Basin A procedure doesn't follow the same sequence, but all operators are experienced enough and well-trained enough to know better, so they do it the B way.
- He doesn't believe in the procedure change system. "It takes forever to get a change, and when a revision is finally issued it doesn't say what we submitted."
- When asked whether the procedure is an operator aid, he had no idea.

Document Review

Procedures for pumping A and B retention basins were compared. Several differences between the two were noted.

- Safety requirements are not identical (one procedure requires two operators to be present, the other does not).
- Signature designee's have different titles (HP Area Manager instead of HP Chief Supervisor).
- B procedure includes a statement that valves in a step need not be done in order; A does not.
- B allows cracking a valve open and alternately shutting another valve in a series of steps designed to maintain prime on a pump, but A does not have the same sequence (though operators do it the B way).
- A procedures has instructions for when the level in the basin rises too high (a specific note on the gauge instead of volume attachment); "B" does not.
- Both A and B procedures were approved several years ago by the same person, who is no longer employed at the facility.
- The correct revisions of the procedures were used.
- The procedures have always been different.

Additional information:

- Technical specification for the pump has a warning about potential damage to the pump if the pump is deadheaded. This is not stated in either procedure.

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- Currently, there are no changes to either procedure in the system.
- The A and B pumpdown stations are identical in design.
- The current procedure-change system is inefficient. Getting a procedure changed is difficult and time-consuming. Too many approval signatures are required, and each reviewer has excessive time allotted for review. The tracking system is ineffective.
- There are no related ORPS for basin operations.
- The procedure-development process is not clearly defined as evidenced by the writer's guide and the procedure-development instruction.

Training/Qualification

Operators:

- Operator qualifications are obtained through on-shift training (OJT). A qualified operator trains and monitors trainees.
- The shift supervisor is responsible for final qualifications of all operators. He interviews each trainee and observes them performing various procedures. It is a formal process that is well documented.
- The supervisor does random checks of operators performing procedures, though he is not required to do so by procedure or policy.
- The operators take a bi-annual requalification exam. This is a written exam. The shift supervisor also interviews each operator for requalification. The test and interview questions are reasonably difficult and

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encompass a wide range of operator knowledge. The written test is made up of random questions from a question bank. The last three tests contained questions on procedure use.

Interviews

Original Operator:

- Doesn't have confidence in the procedure change system at WTF, so he doesn't bother to submit changes.
- Doesn't understand why deadheading a pump is prohibited in some cases and not in others.
- Qualified for one year.
- States that the reason he deviates from the procedure even though he knows that he's not supposed to is that he knows he's technically right.
- States that they deviate from other procedures that are also incorrect.
- Was trained by another operator to perform the Basin A procedure the Basin B way.
- Says a sample (for gross activity) must be taken and analyzed prior to basin pumpdown. Supervisor directs basin pumpdown after getting good sample results.

Shift Supervisor:

- Recently promoted to shift supervisor after spending seven years as an operator.

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- States that deadheading the pumps at both Basin A and Basin B is not desirable since this design depends on flow to keep the pump from overheating.
- Has not submitted changes to the procedure.
- Instructs his shift to use the Basin B procedure at Basin A.
- Had the results for the sample (taken 1 hour earlier) prior to directing operator to pump down the basin. The sample was within specifications for discharge (measured for gross activity). The second sample is just a back-up.
- Instructs his operators to deviate from two other procedures with similar problems.
- States that operator aids are not needed in the facility.

Facility Manager/Operations Manager:

- Is aware that there is a problem with the procedure-change system and states that there is a new procedure-change system in development. Changes currently take six months to a year.
- States that the average time for procedure revision is between nine months to a year.
- States there is an interim procedure-change system (immediate revision) that can be used for quick approval of necessary revisions. Requires the facility manager's or operations manager's signature and a procedure-revision request.

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Training Group:

- Not aware that operators are deviating from procedures or that they are being trained to deviate when they believe it necessary.

Other Operators - see observations

SOLUTIONS

Ch. 16: Operations Procedures

(pg. I-88, guideline 1, Procedural Development)

All procedures should provide administrative and technical direction to conduct the intent of the procedure effectively.

(pg. I-88, guideline 2, Procedure Content)

Procedures should be technically and administratively accurate.

(pg. I-90, guideline 3, Procedure Changes and Revisions)

Procedure changes and revisions are necessary to ensure that procedures reflect current operating practices and requirements. Appropriate procedure changes and revisions should be initiated when procedure inadequacies or errors are noted.

(pg. I-92, guideline 7, Procedure Use)

If procedures are deficient, a procedure change should be initiated.

Related Discrepancies

- *The procedure, as written, will cause the operator to dead head the pump. The operator is forced to throttle the valves to avoid dead heading the pump. The procedure is incorrectly written.*
- *Rather than implement a procedure change, the operators continue to improvise during the use of the procedure by throttling the valves.*

Ch. 17: Operator Aid Postings

(pg. I-95, Introduction)

An operator aid program should be established to ensure that operator aids that are posted are current, correct, and useful.

(pg. I-95, guideline 2, Approval)

The operations supervisor, or higher authority, should approve all operator aids. The person approving the aid should ensure that it is necessary and correct.

(pg. I-96, guideline 6, Review)

The posted operator aids should be reviewed periodically to ensure they are still correct and necessary.

Related Discrepancies

- The procedure, which was used as an operator aid, is not approved and is technically incorrect.***
- The operator stated that there are no operator aids at the facility.***

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NOTES